

## PATENT ABSTRACTS OF JAPAN

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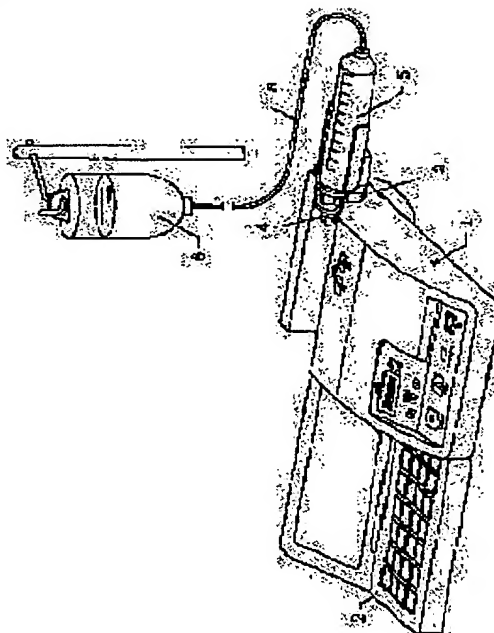
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## (54) DEVICE AND METHOD FOR PACKING LIQUID CHEMICALS

(57)Abstract:

**PROBLEM TO BE SOLVED:** To pack liquid chemicals such as a contrast medium in a syringe from a vessel such as a bottle for the portion of a required amount without uselessness by providing a driving mechanism for relatively moving a piston holder with respect to a syringe holder and moving the piston holder in accordance with the amount of the liquid chemicals, which is calculated by means of an arithmetic means.

**SOLUTION:** A liquid chemicals packing device is constituted of a sucker main body 1 and an arithmetic part 2. The syringe 5 is set in the syringe holder 3 and the piston holder 4 and connected to the bottle with the liquid chemicals in it by a connecting tube 8. Besides, a required inspection condition is inputted from the keyboard of the arithmetic part 2 and the arithmetic part 2 calculates the amount of the contrast medium based on the inputted inspection condition. Besides, the movement amount of a piston in the syringe 5 is calculated in accordance with the liquid chemicals amount to be given, a signal is transmitted to a motor by which driving force is transmitted to the piston holder 4, the piston is moved and the liquid chemicals are sucked. Thus, an optimum amount of liquid chemicals is packed in the syringe and the waste of the liquid chemicals is eliminated.



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## CLAIMS

[Claim(s)]

[Claim 1]A drug solution filling apparatus which is provided with the following and characterized by said piston holder moving according to quantity of a drug solution computed by said calculating means.

A cylinder holder which is a drug solution filling apparatus which transfers a drug solution stored by container to a syringe, and is filled up with it, and holds a pipe of a syringe.

A piston holder holding a piston of a syringe.

Drive mechanism to which said piston holder is relatively moved to said syringe holder.

A means to input a verification condition, and an operation and a memory measure which compute quantity of a required drug solution based on a verification condition.

[Claim 2]It is a drug solution filling method which transfers a drug solution stored by container to a syringe, and

is filled up with it, To a cylinder holder and a piston holder with which a drug solution filling apparatus was equipped. After setting a pipe and a piston of a syringe, respectively and connecting a tip of this syringe to a connection tube connected with a container with which said drug solution is stored, Input a verification condition by an input means with which said drug solution filling apparatus was equipped, and quantity of a required drug solution is computed by a calculating means with which said drug solution filling apparatus was equipped, A drug solution filling method moving said piston holder according to quantity of a computed drug solution, attracting a drug solution of a complement from said container, and filling up said syringe.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the device and filling method for transferring drug solutions, such as a contrast medium used in the cases, such as MRI (magnetic resonance imaging), X-ray CT, the Ain Guiot imaging, and a urography, to a syringe, and being filled up with them from a bottle etc.

[0002]

[Description of the Prior Art]Since the contrast medium used for diagnosis of MRI, X-ray CT, etc. is generally a liquefied object with high viscosity, medicating a patient using an automatic dosing device is performed.

Generally sale and supply of the contrast medium are performed with the gestalt of bottle \*\*, or the gestalt with which the syringe was filled up. Since the product of the gestalt with which the syringe was filled up can equip a contrast-medium power injector as it is and can medicate a patient, time and effort is not taken but it is simple. When neither the case where the syringe with which the drug solution was filled up cannot be used on the other hand, nor a syringe is filled up with the drug solution, it is necessary to move a drug solution from a bottle to a syringe in advance of administration to a patient. However, remarkable time and effort performs inhalation for the moving to a syringe by hand. Although it was generally possible to have inhaled using the contrast-medium power injector for administration to a patient, the problem of moving not being worked or being unable to move a proper initial complement was during the use for administration.

[0003]By the way, the dose of a contrast medium changes with a patient's weight, diagnostic parts, etc. When repacking from a bottle conventionally, the whole quantity or the quite larger quantity of the drug solution in a bottle were transferred to the syringe, since the required dose was set up and prescribed for the patient with the automatic dosing device, an excessive drug solution will be left in a syringe after administration, and the contrast medium was very useless.

[0004]

[Problem(s) to be Solved by the Invention]This invention is made in view of such a conventional problem, and is a thing.

When the purpose transfers a drug solution to a syringe and is filled up with it from containers, such as a bottle, it is providing the drug solution filling apparatus filled up with a drug solution only an initial complement's not having futility, and a drug solution filling method.

[0005]

[Means for Solving the Problem]A cylinder holder which this invention is a drug solution filling apparatus which transfers a drug solution stored by container to a syringe, and is filled up with it, and holds a pipe of a syringe, A piston holder holding a piston of a syringe, and drive mechanism to which said piston holder is relatively moved to said syringe holder, It has a means to input a verification condition, and an operation and a memory measure which compute quantity of a required drug solution based on a verification condition, and is related with a drug solution filling apparatus, wherein said piston holder moves according to quantity of a drug solution computed by said calculating means.

[0006]This invention is a drug solution filling method which transfers a drug solution stored by container to a syringe, and is filled up with it, To a cylinder holder and a piston holder with which a drug solution filling apparatus was equipped. After setting a pipe and a piston of a syringe, respectively and connecting a tip of this syringe to a connection tube connected with a container with which said drug solution is stored, Input a verification condition by an input means with which said drug solution filling apparatus was equipped, and

quantity of a required drug solution is computed by a calculating means with which said drug solution filling apparatus was equipped. It is related with a drug solution filling method moving said piston holder according to quantity of a computed drug solution, and filling up said syringe with a drug solution of a complement from said container.

[0007]

[Embodiment of the Invention] Drawing 1 shows the appearance of one example of the drug solution filling apparatus of this invention. The drug solution filling apparatus shown in this example is provided with the main part 1 of aspirator, and the operation part 2. The main part 1 of aspirator holds the cylinder holder 3 for holding the pipe of a syringe, and the piston of a syringe, and is relatively provided with the movable piston holder 4 to a cylinder holder. Although not furthermore illustrated in this drawing, it has the actuator containing the motor for moving the piston holder 4. The operation part 2 is a keyboard which is an input means for inputting a verification condition, a display, and the computer which equipped the inside with the operation and the memory measure further.

[0008] First, a pipe and a piston are set to a cylinder holder and a piston holder, respectively, and the syringe 5 is connected via the bottle 6 and the connection tube 8 containing a drug solution, as shown in a figure.

[0009] As shown in the flow chart of drawing 2, a required verification condition is first inputted from the keyboard of operation part. Hereafter, when it explains taking the case of the case of X-ray CT diagnosis, inputted items are scan conditions of X-ray CT, an examination part, a patient's weight, a kind of contrast medium, etc. This can be changed suitably if needed.

[0010] Based on the inputted verification condition, a computer computes the quantity of a contrast medium. Although there is no restriction in particular about a calculating method, for example to each inputted item, the required amount of standards of a contrast medium or an operation coefficient is put in a database beforehand, and is memorized, and the method of computing with reference to this according to an inputted item is mentioned. For example, the standard dose required for the patient of standard weight is memorized for every kind of contrast medium, on the other hand, the coefficient to a standard dose is prepared with the computing equation about weight and scan conditions, and when an item and data are inputted, the optimum amount is computed by calculating based on a predetermined formula.

[0011] Thus, if the dose of a drug solution is decided, the movement magnitude of the piston of a syringe will be calculated, a signal will be sent to the motor transmitted to a piston holder, a piston will move, and a drug solution will be attracted. Under the present circumstances, when using the syringe of two or more kinds, the mold of a syringe, etc. are inputted and the movement magnitude of a piston can be decided by computer. As for the movement magnitude of a piston, it is preferred to also take into consideration and decide the dead space in the connection tube 8.

[0012] Thus, since a syringe will be filled up with the optimal quantity of a drug solution if the filling apparatus of this invention is used, when prescribing a drug solution for the patient to a patient, it is not necessary to set up again. Therefore, the direction of the pouring device used when prescribing a drug solution for the patient to a patient can be used as a comparatively easy device. And since only required chemical quantity is moved from a bottle to a syringe, a drug solution does not become useless. An effect is large especially when using the drug solution stored by the mass bottle when an expensive drug solution was used especially.

[0013] In the above-mentioned explanation, although explained taking the case of the contrast medium of X-ray CT, it can use also for restoration of the drug solution of the use of others, such as a contrast medium for MRI, and for [ the object for the Ain Guiot imaging, for urographies, etc. ]. However, the device of this invention is most preferably used in the use transferred and filled up with the comparatively high drug solution of viscosity like a contrast medium.

[0014] As there will be no restriction in particular if a cylinder holder and the piston holder can hold the pipe and piston of a syringe, respectively, for example, shown in drawing 1, what fits into the flange of the pipe of a syringe and the flange of a piston is used. Drawing 3 (perspective view) and drawing 4 (top view) are the enlarged drawing, and showed signs that the flange 7 of the piston was held at the piston holder 4. Like this example, if the slot of a piston holder is made larger about 1 mm than the thickness of the flange 7 of a piston, attachment and detachment of a piston will become easy.

[0015] The ball screw nut which restriction in particular does not have a mechanism to which a piston holder is moved, either, for example, screws with a stepping motor, a ball screw axis, and a ball screw axis, and supports a piston holder can be used. In this case, a ball screw nut can be moved to shaft orientations with a piston holder by rotating a stepping motor based on the signal transmitted from the calculating means (passing a suitable interface as occasion demands), and rotating a ball screw axis by that cause.

[0016] After pushing in the piston of a syringe automatically, checking that of attainment to a tip in advance of suction of a drug solution and carrying out degassing simultaneously, it is also programmable to attract the drug solution of an initial complement.

[0017] You may be separate although a computer and piston driving are dedicated and unified in one housing in the example shown in drawing 1. Like this example, the main part 1 side of aspirator also sets up advance of a piston holder, retreat, a stop, a suction speed (movement speed), etc., and with hand control. Or although it is preferred to enable it to operate automatically about a comparatively easy motion, it can also enable it to control all by the computer side.

[0018]

[Effect of the Invention] According to this invention, when drug solutions, such as a contrast medium, are transferred to a syringe and it is filled up with them from containers, such as a bottle, the drug solution filling

apparatus filled up with a drug solution that only an initial complement does not have futility and a drug solution filling method can be provided.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a figure showing one example of the drug solution filling apparatus of this invention.

[Drawing 2]It is a flow chart which shows the drug solution filling method of this invention.

[Drawing 3]It is an enlarged drawing (perspective view) showing one example of the drug solution filling apparatus of this invention.

[Drawing 4]It is an enlarged drawing (top view) showing one example of the drug solution filling apparatus of this invention.

[Description of Notations]

- 1 The main part of aspirator
- 2 Operation part
- 3 Cylinder holder
- 4 Piston holder
- 5 Syringe
- 6 Bottle
- 7 The flange of a piston
- 8 Connection tube

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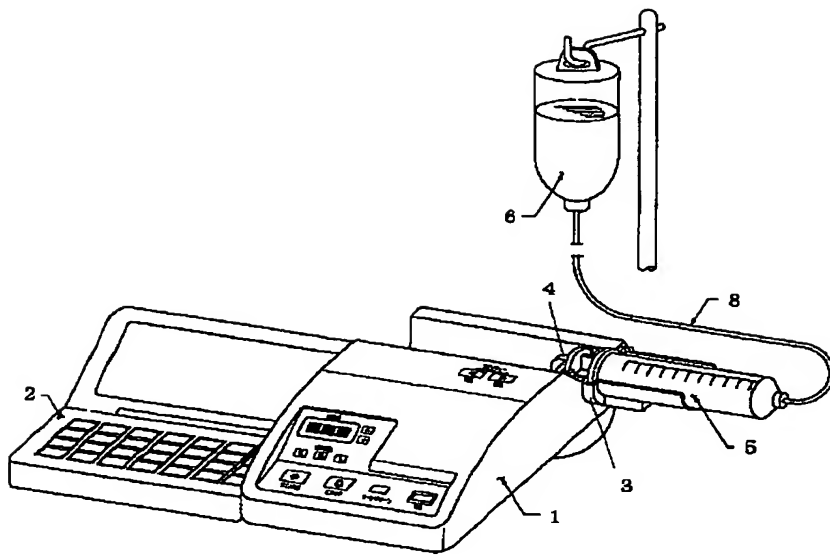
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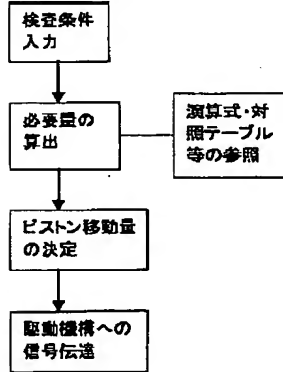
## DRAWINGS

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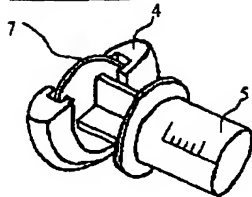
[Drawing 1]



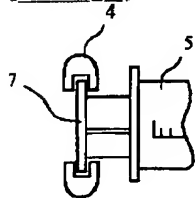
[Drawing 2]



[Drawing 3]



[Drawing 4]



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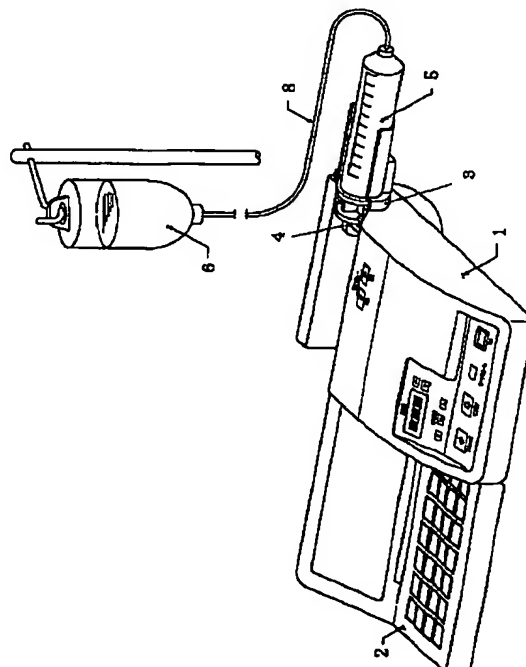
4C096 AA10 AA11 AB50 FC14

(54) 【発明の名称】 薬液充填装置および薬液充填方法

(57) 【要約】

【課題】 本発明は、造影剤等の薬液をボトル等の容器からシリンジに移液して充填する際に、薬液を必要量だけ無駄なく充填する薬液充填装置、および薬液充填方法を提供することを目的とする。

【解決手段】 容器に収納されている薬液をシリンジに移液して充填する薬液充填装置であって、シリンジの筒を保持するシリンダホルダと、シリンジのピストンを保持するピストンホルダと、前記シリンジホルダに対して前記ピストンホルダを相対的に移動させる駆動機構と、検査条件を入力する手段と、検査条件に基づき必要な薬液の量を算出する演算・記憶手段とを備え、前記演算手段によって算出された薬液の量に合わせて前記ピストンホルダが移動することを特徴とする薬液充填装置。



## 【特許請求の範囲】

【請求項1】 容器に収納されている薬液をシリンジに移液して充填する薬液充填装置であって、シリンジの筒を保持するシリンダホルダと、シリンジのピストンを保持するピストンホルダと、前記シリンジホルダに対して前記ピストンホルダを相対的に移動させる駆動機構と、検査条件を入力する手段と、検査条件に基づき必要な薬液の量を算出する演算・記憶手段とを備え、前記演算手段によって算出された薬液の量に合わせて前記ピストンホルダが移動することを特徴とする薬液充填装置。

【請求項2】 容器に収納されている薬液をシリンジに移液して充填する薬液充填方法であって、薬液充填装置に備えられたシリンダホルダおよびピストンホルダに、それぞれシリンジの筒およびピストンをセットし、このシリンジの先端を前記薬液が収納されている容器と連結した接続チューブに接続した後、前記薬液充填装置に備えられた入力手段により検査条件を入力し、前記薬液充填装置に備えられた演算手段によって必要な薬液の量を算出し、算出された薬液の量に合わせて前記ピストンホルダを移動させて必要な量の薬液を前記容器から吸引して前記シリンジに充填することを特徴とする薬液充填方法。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、MRI (magnetic resonance imaging)、X線CT、アンギオ造影、尿路造影などの際に用いられる造影剤等の薬液を、ボトルなどからシリンジに移液して充填するための装置および充填方法に関する。

## 【0002】

【従来の技術】MRIやX線CTなどの診断のために用いられる造影剤は、一般に粘度の高い液状体であるので自動注入装置を用いて患者に投与することが行われている。また、造影剤の販売・供給は、一般にボトル詰の形態やシリンジに充填された形態で行われている。シリンジに充填された形態の商品は、造影剤自動注入器にそのまま装着して患者に投与することが可能であるので手間が掛からず簡便である。一方、薬液が充填されたシリンジを利用できない場合やシリンジに薬液が充填されていない場合には、患者への投与に先立ち薬液をボトルからシリンジに移し替える必要がある。しかし、シリンジへの移し替えのための吸入を手で行うのはかなりの手間である。また、患者への投与のための造影剤自動注入器を用いて吸入することは一般には可能であるが、投与のための使用中には移し替えの作業を行うことができなかったり、適正な必要量を移し替えることができないなどの問題があった。

【0003】ところで造影剤の投与量は、患者の体重、診断部位等によって異なる。従来は、ボトルからの詰め

替えの際に、ボトル中の薬液の全量またはかなり多めの量をシリンジに移液して、自動注入装置で必要投与量を設定して投与していたため、投与後余分な薬液をシリンジ内に残すことになり、造影剤が非常に無駄になっていた。

## 【0004】

【発明が解決しようとする課題】本発明は、このような従来の問題点に鑑みてなされたものであり、造影剤等の薬液をボトル等の容器からシリンジに移液して充填する際に、薬液を必要量だけ無駄なく充填する薬液充填装置、および薬液充填方法を提供することを目的とする。

## 【0005】

【課題を解決するための手段】本発明は、容器に収納されている薬液をシリンジに移液して充填する薬液充填装置であって、シリンジの筒を保持するシリンダホルダと、シリンジのピストンを保持するピストンホルダと、前記シリンジホルダに対して前記ピストンホルダを相対的に移動させる駆動機構と、検査条件を入力する手段と、検査条件に基づき必要な薬液の量を算出する演算・記憶手段とを備え、前記演算手段によって算出された薬液の量に合わせて前記ピストンホルダが移動することを特徴とする薬液充填装置に関する。

【0006】また本発明は、容器に収納されている薬液をシリンジに移液して充填する薬液充填方法であって、薬液充填装置に備えられたシリンダホルダおよびピストンホルダに、それぞれシリンジの筒およびピストンをセットし、このシリンジの先端を前記薬液が収納されている容器と連結した接続チューブに接続した後、前記薬液充填装置に備えられた入力手段により検査条件を入力し、前記薬液充填装置に備えられた演算手段によって必要な薬液の量を算出し、算出された薬液の量に合わせて前記ピストンホルダを移動させて必要な量の薬液を前記容器から前記シリンジに充填することを特徴とする薬液充填方法に関する。

## 【0007】

【発明の実施の形態】図1は、本発明の薬液充填装置の1例の外観を示したものである。この例で示す薬液充填装置は、吸引器本体1と演算部2を備えている。吸引器本体1は、シリンジの筒を保持するためのシリンダホルダ3、シリンジのピストンを保持しシリンダホルダに対して相対的に移動可能なピストンホルダ4を備え、さらにこの図面では図示していないが、ピストンホルダ4を移動させるためのモータを含む駆動部を備えている。演算部2は、検査条件を入力するための入力手段であるキーボード、ディスプレイ、さらに内部に演算・記憶手段を備えたコンピュータである。

【0008】まず、シリンジ5を図のように、筒とピストンをそれぞれシリンダホルダとピストンホルダにセットし、薬液の入ったボトル6と接続チューブ8を介して接続する。

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【0009】図2のフローチャートに示すように、まず演算部のキーボードから、必要な検査条件を入力する。以下、X線CT診断の場合を例にとって説明すると、入力項目は、X線CTのスキャン条件、検査部位、患者の体重、造影剤の種類等である。これは、必要に応じて適宜変更することができる。

【0010】入力された検査条件に基づき、コンピュータが造影剤の量を算出する。算出方法については特に制限はないが、例えば各入力項目に対して必要な造影剤の標準量か、または演算係数を予めデータベース化して記憶しておき、入力項目に応じてこれを参照して算出する方法が挙げられる。例えば、造影剤の種類ごとに標準体重の患者に必要な標準投与量を記憶しておき、一方、体重、スキャン条件等については、標準投与量に対する係数を演算式で用意しておき、項目・データが入力されたときに所定の式に基づいて演算して最適量を算出する。

【0011】このようにして薬液の投与量が決められると、シリンジのピストンの移動量が算定され、ピストンホルダに伝達されるモータに信号が送られ、ピストンが移動し、薬液が吸引される。この際、複数の種類のシリンジを用いる場合は、シリンジの型等を入力するよう

におき、コンピュータによりピストンの移動量を決めるようにすることもできる。また、ピストンの移動量は、接続チューブ8の中のデッドスペースも考慮して決めることが好ましい。

【0012】このように、本発明の充填装置を用いると、最適な量の薬液がシリンジに充填されるので、患者に対して薬液を投与する際に再度設定する必要がない。従って患者に対して薬液を投与する際に用いられる注入装置の方は、比較的簡単な装置とすることができる。そして、必要な薬液量だけがボトルからシリンジに移されるので、薬液が無駄にならない。特に高価な薬液を用いた場合、大容量のボトルに収納された薬液を使用する場合に特に効果が大きい。

【0013】上記の説明において、X線CTの造影剤を例に取って説明したが、MRI用の造影剤や、アンギオ造影用、尿路造影用等のその他の用途の薬液の充填にも用いることができる。しかし、本発明の装置は、造影剤のような粘度の比較的高い薬液を移液して充填する用途において最も好ましく用いられる。

【0014】また、シリンダホルダおよびピストンホルダは、シリンジの筒およびピストンをそれぞれ保持できるものであれば特に制限はなく、例えば図1に示したように、シリンジの筒の鍔部、ピストンの鍔部に嵌合するようなものが用いられる。図3（斜視図）、図4（平面図）は、その拡大図であってピストンの鍔部7がピストンホルダ4に保持されている様子を示した。この例のよ

うに、ピストンホルダの溝をピストンの鍔部7の厚さより1mm程度広くすると、ピストンの着脱が容易になる。

【0015】また、ピストンホルダを移動させる機構も特に制限はなく、例えばステッピングモータ、ボールネジ軸、およびボールネジ軸と螺合しピストンホルダを支持するボールネジナットを用いることができる。この場合、演算手段から伝達された信号に基づき（必要により適当なインターフェースを介して）ステッピングモータを回転させ、それによりボールネジ軸を回転させることでピストンホルダと共にボールネジナットを軸方向に移動させることができる。

【0016】また、薬液の吸引に先立ち、自動でシリンジのピストンを押し込んで最先端まで到達を確認して同時にエア抜きをしてから必要量の薬液を吸引するようにプログラムすることもできる。

【0017】また、図1に示した例では、コンピュータとピストン駆動機構とが1つハウジングの中に納められて一体化されているが、別々になっていても構わない。また、この例のように吸引器本体1の側でもピストンホルダの前進、後退、停止、吸引速度（移動速度）等の設定をして、手動により、または比較的簡単な動きについては自動で運転できるようにしておくことが好ましいが、コンピュータ側で全部制御するようにしておくこともできる。

【0018】

【発明の効果】本発明によれば、造影剤等の薬液をボトル等の容器からシリンジに移液して充填する際に、薬液を必要量だけ無駄なく充填する薬液充填装置、および薬液充填方法を提供することができる。

【図面の簡単な説明】

【図1】本発明の薬液充填装置の1例を示す図である。

【図2】本発明の薬液充填方法を示すフローチャートである。

【図3】本発明の薬液充填装置の1例を示す拡大図（斜視図）である。

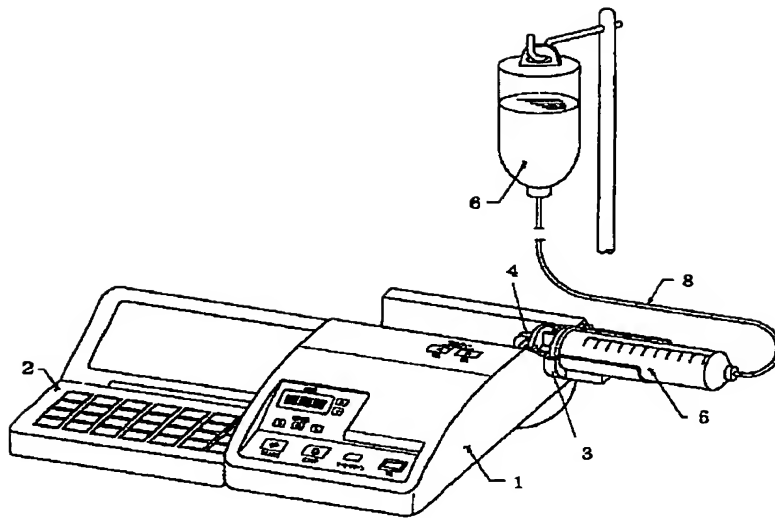
【図4】本発明の薬液充填装置の1例を示す拡大図（平面図）である。

【符号の説明】

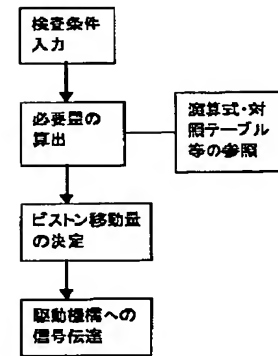
- 1 吸引器本体
- 2 演算部
- 3 シリンダホルダ
- 4 ピストンホルダ
- 5 シリンジ
- 6 ボトル
- 7 ピストンの鍔部
- 8 接続チューブ



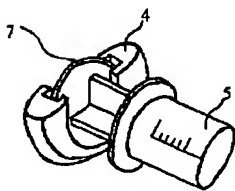
【図1】



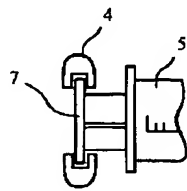
【図2】



【図3】



【図4】



## PATENT ABSTRACTS OF JAPAN

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(22)Date of filing : 23.06.1999

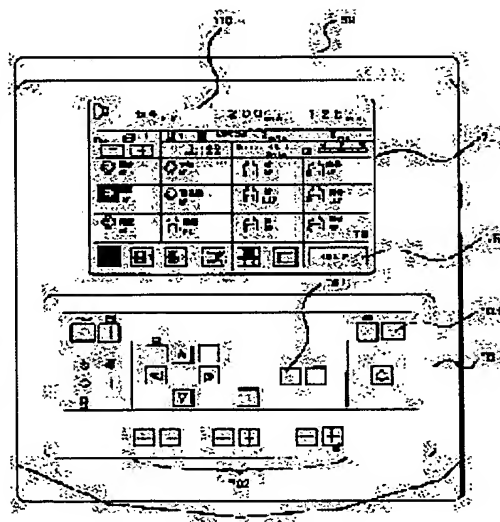
(72)Inventor : KOBAYASHI ICHIRO  
HIRABAYASHI TOSHIHIRO  
AMANO KOJI

## (54) X-RAY IMAGING DEVICE

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To allow an operator to easily manipulate an X-ray imaging operation to increase operability by selecting a desired imaging part from the imaged area, and displaying the selected part on a display panel.

**SOLUTION:** This system supports an X-ray imaging operation and is provided with a personal computer 10, and input unit 11, and a printer 12. The personal computer 10 is provided with a storage reading device 14 to control a storage media 13, a display pointer 15 connected to the storage reading device 14, a data collection input device 16, and a display device 17 which displays a data image specified by the display pointer 15. When using the system, a user specifies a cranium from an imaged area displayed on the display device 17 (display panel 71) using the display pointer 15. Multiple imaged parts corresponding to the pointers of an imaged part file are displayed, and a paranasal sinus is selected as an example, and corresponding image data and condition data of the selected part are displayed on the display device 17.



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## CLAIMS

## [Claim(s)]

[Claim 1]X-rays equipment choosing desired positioning from said photographing part in roentgenography \*\*\*\* X-rays equipment based on operator command characterized by comprising the following from a console, and displaying this posture on said display panel or another display panel.

A navigational panel for controlling an x-ray high-voltage generator.

A display panel which displays a photographing condition over a photographing part of analyte, and its part.

[Claim 2]The X-rays equipment according to claim 1 displaying an example of a clinical photograph corresponding to said positioning on said display panel or another display panel.

[Translation done.]

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[The technical field to which an invention belongs] This invention relates to the X-rays equipment which performs roentgenography based on the operator command from a console. In particular, the photographing condition over the positioning which should be made the standard of roentgenography, and its posture is displayed on the display panel of a console, and the example of a clinical photograph of positioning is displayed on a display panel if needed, and it is related with the X-rays equipment which makes operation of the roentgenography by an operator easy.

[0002]

[Description of the Prior Art]The perspective view and drawing 8 which drawing 7 and drawing 8 show the console in the conventional X-rays equipment, and drawing 7 shows the whole console are an enlarged plan view of the navigational panel and display panel of a console. The example of below-mentioned this invention is included in this drawing 8. The console is constituted by the buck 60, the support plate 61 supported by this, and the jack key lamp panel 62 attached at the tip of this support plate 61. The jack key lamp panel 62 contains the ANATOMI cull program (Ishiyaku Publishers, Inc.: radiodiagnosis apparatus engineering, the medical radiation science lecture 13, P108, 4.4 program photographing function) for controlling an X ray controller. The navigational panel 70 which has a touch button for setting the touch button and photographing condition for operating this program to the surface of this jack key lamp panel 62, and emitting X-rays to it, etc., By operating this navigational panel 70, it consists of the display panel 71 in which the desired photographing part and photographing condition of details are displayed by touching the button of the part which displayed the photographing part of analyte and was chosen among this photographing part. When an operator carries out roentgenography, the upper button of the program page button 701 of the touch panel 70 is pushed, and the 1st photographing part (for example, a cranium, a thorax, an abdomen, a backbone, an upper extremity, etc.) is expressed to the display panel 71 as the form of a table. Next, an operator chooses the 2nd photographing part from the 1st photographing parts. for example, the 2nd photographing part that shows cranial details to the display panel 71 by operation of an ANATOMI cull program when the 1st photographing part is a cranium and the touch button displayed as this cranium is pushed — [— for example, A skull (back to front), a skull (side), a skull (shaft orientations), a mandible (back to front), a paranasal sinus (back to front)], etc. are displayed. If the portion (touch type button) as which an operator chooses the part photoed from this 2nd photographing part, and that selected part is displayed is pushed, The photographing condition 710 about the photographing part, for example, tube voltage, (64 kV), tube current (200 mA), and exposure time (125 ms) are displayed on the highest rung of a display panel. 702 is \*\* touch button for tuning finely the tube voltage, tube current, and exposure time which were displayed on the photographing condition 710. If a photographing condition is set up by the above operation, an operator will push the X-ray emission button 703 of the navigational panel 70, and will perform roentgenography.

[0003]

[Problem(s) to be Solved by the Invention]Conventionally which was described above, with a device, if an operator chooses the photographing part of the 2nd request from the 1st photographing part, roentgenography of the photographing conditions, such as tube voltage, tube current, and exposure time, will be set up and carried out, but. In this case, there is no display of from which direction of a photographing part to emit X-rays, and there is a case where time is taken in the work which checks the transmission direction of X-rays for an unfamiliar operator to roentgenography, except for a veteran's operator.

[0004]The purpose of this invention provides a RUPU function in that for supporting the photographing operation of an operator at jack key lamp panel. It is in displaying the transmission direction of the X-rays to a photographing part on a display panel etc., and displaying the standard clinical photograph to the photographing part on a display panel etc. if needed, and making roentgenography operation of an operator still easier.

[0005]

[Means for Solving the Problem]To achieve the above objects, a navigational panel for this invention to control an x-ray high-voltage generator, In X-rays equipment which performs roentgenography based on operator command from a console which consists of a display panel which displays a photographing condition over a photographing part of analyte, and its part. It constituted so that desired positioning might be chosen from said photographing part and this posture might be displayed on said display panel or another display panel.

[0006]It constituted so that a clinical photograph corresponding to said positioning might be displayed on said display panel or another display panel. Data which described the feature of the photographing condition to said positioning

was displayed on a display panel with the positioning. Data which described the feature of said clinical photograph was displayed on a display panel with the clinical photograph.

[0007]

[Embodiment of the Invention]Drawing 1 is a hardware-constitutions figure of the system which supports roentgenography operation of this invention. Drawing 2 shows the file organization of the photographing part and positioning which are formed in the storage of this invention, and a condition table. Drawing 3 is a figure for explaining the contents of the positioning of drawing 2, and the file of a condition table.

[0008]The hardware of the system of drawing 1 consists of the personal computer 10, the input unit 11, and the printer 12. The processing unit 14 for the personal computer 10 to control the storage 13. It is constituted by the display designating operation machine 15 connected to the processing unit 14 via the I/O control unit, for example, a mouse, the data correction input device 16, and the display 17 that displays a data image by specification of the display designating operation machine 15. The input unit 11 consists of the photographing condition unit 19 for inputting the image input unit 18 and photographing condition for inputting the picture of the below-mentioned positioning into the storage 13 into the same medium, and is connected to the personal computer 10 via the I/O control unit.

[0009]In this invention, this personal computer is formed in above-mentioned drawing 7 and the jack key lamp panel 62 of drawing 8. In this case, the input unit 11, the display operation machine 15, and the data correction input device 16 are formed in the touch panel 70 of the jack key lamp panel 62, and use the display 17 as the display panel 71. The internal organs also of the printer 12 may be carried out to the jack key lamp panel 62. Although the display designating operation machine 15 was formed in the touch panel 70, this display designating operation machine 15 is good to provide in the suitable place of the display panel 71 as touch type push button 15' named "HELP" for supporting the operation of an operator. In the example of the figure, it provided in the lower right corner of the display panel 71.

[0010]Next, the file organization of the example of this invention of drawing 2 is explained. Photographing part file (I) shows the first photographing part when photoing each part of analyte using X-rays equipment.

[0011]At this invention, the first photographing part 20 is thorax (I) from a cranium, (II), and (III)... Even the child is classified into ten items. These items are memorized by the storage 13 from the photographing condition input unit 19 of drawing 1. It is [ establish the field of photographing part file (I) in the storage 13, and / in this field ] the pointer a1 and a2... The alphabetic data of the photographing part 20 is memorized at each to the storage area shown by a10.

[0012]Photographing part file (II) consists of the second photographing part 21 that shows the details of the photographing part for every item of the first photographing part 20 of photographing part file (I). Namely, the skull (back to front), skull (side) in which the "cranium" shown, for example with the pointer a1 was shown by b15 from the pointer b11 ... It is subdivided like a paranasal sinus. By photographing part file (II), the "upper extremity" shown with the pointer a8 is subdivided so that it may be shown by b89 from the pointer b81. That is, a "upper extremity" is subdivided by the scapula b81, the humerus b82, the elbow joint (before or after) b83, the antebrachial bone b84, the antebrachial bone b85, the wrist jaw (before or after) b86, the wrist jaw (side) b87, the bone of hand (back to front) b88, and the bone of hand (side) b89. Each item of second photographing part file (II) subdivided in this way is memorized by the storage (13) with a photographing condition input unit (19). Establish the field of photographing part file (II) in a storage (13), and the pointers a1-a10 corresponding to the pointers a1-a10 of photographing part file (I) are specified as it. The data of the photographing part subdivided by adding the pointers b11-b100 to the area of this pointer, respectively is memorized.

[0013]Next, file (III) of the positioning of drawing 2 and a condition table consists of the image data 22 which shows positioning corresponding to each item shown with the pointers b11-b100 of photographing part file (II), and the condition data 23 in which the photographing condition over this image data 22 is shown. Corresponding to the photographing part 21 shown with the pointers b11-b100 of photographing part file (II), the image data 22 is a picture which shows positioning, and shows into what kind of photographing condition the condition data 23 should be made to each image data 22, respectively.

[0014]Drawing 3 indicates the editing table 31 to be the picture 30 (photograph) over the paranasal sinus (back to front) b15 of photographing part file (II). The picture 30 shows the positioning in the case of carrying out roentgenography of the paranasal sinus. In this case, penetrating X-rays toward the face from a head rear face is shown. This picture part is photoed with a digital camera. The editing table 31 showing what kind of photographing condition it should be made is formed to such a picture 30. That is, as shown in drawing 3, the tube current mA of X-rays equipment, the exposure time sec, photographic subject thickness cm, the tube voltage kV, distance cm, a grid book / cm, etc. are shown. Thus, the picture 30 which shows positioning photos a human body model with this digital camera to each of the photographing part 21 of photographing part file (II), and matches the data 23 of a photographing condition to the image data 22 of the positioning of file (III), and nothing and these image data 22. This image data 22 is memorized by the storage 13 with the image input unit 18 of drawing 1, for example, an image scanner, and the condition data 23 is memorized by the storage 13 with the photographing condition unit 19. The field of file (III) of positioning and a condition table is provided, b11-1 corresponding to the pointers b11-b100 of photographing part file (II) - b100-1 are specified, and the image data 22 corresponding to this appointed area and the condition data 23 are inserted in the storage 13.

[0015]Although drawing 3 showed the example which matched the picture 30 which shows positioning, and the editing table 31. In this case, it is good to form the help 32 other than an editing table, to describe that "positioning" (how to take positioning), "the point of photography" (focus of photography), etc. to the image data 22 of each positioning like drawing 3, in this item, and to make it the help of the attendant of X-rays equipment. In accordance with the time of memorizing to the storage 13, this help 32 memorizes the condition data 23 of drawing 2 to a storage.

[0016] Drawing 4 shows a file with the help which consists of the alphabetic data 41 which described the focus of the clinical photograph formed to the image data 40 which consists of a clinical photograph taken with X-rays equipment to each of the second photographing part 21 of drawing 2, and this data 40, Pointer b11-2 directed with the pointers b11-b100 of drawing 2 for every item of this file - b100-2 are provided. With the input units 18 and 19 of drawing 1, the image data 40 and the alphabetic data 41 are memorized to the storage area of the storage 13 shown by pointer b11-2 - b100-2, respectively.

[0017] Drawing 5 shows the help 51 of the alphabetic data 41 which described the focus of the clinical photograph 50 of the image data 40 of pointer b15-2 of drawing 4 to the paranasal sinus (back to front) b15 which is second photographing part file (II) of drawing 2, and this clinical photograph 50. The clinical photograph 50 is taken with a digital camera, and the picture is memorized as the image data 40 with the input unit 18 in the predetermined storage area of the storage 13.

[0018] As a means to display the positioning of drawing 3 and a photographing condition or the clinical photograph of drawing 5, and a help on the display 17, When any one of the pointers b11-b100 of drawing 2 is chosen, For example, what is necessary is just to program so that the image data 22 and the condition data 23 which are directed by pointer b15-1 corresponding to this may be displayed and the image data 40 and the alphabetic data 41 which are directed to the next by b15-2 may be displayed when the paranasal sinus (back to front) of b15 is chosen. Or when pointer b11-1 - b100-1, pointer b11-2 - b100-2 are provided in two rows and these are selectively specified instead of the pointers b11-b100 of drawing 2, For example, when the image data 22 and the condition data 23 of b15-1 of drawing 2 corresponding to this are displayed when b15-1 is specified, and b15-2 is specified, for example, It may constitute so that the image data 40 and the alphabetic data 41 of b15-2 of drawing 4 corresponding to this may be displayed.

[0019] Next, procedure is explained using drawing 6. The first photographing part 20 first shown in drawing 2 is created (Step 51). This part 20 is inputted into the storage 13 (Step 52). The second photographing part 21 is created (Step 53), and it memorizes to the storage 13 (Step 54). Ideal posture is photoed for every positioning using a model, a photograph (image data 22) like drawing 3 is created, the help 32 is created condition data and if needed to this (Step 55), and these are memorized to the storage 13 (Step 56). A clinical photograph 50 is taken for every positioning, the image data 40 is created, the help 51 (alphabetic data 41) is added to this (Step 57), and these are memorized to a storage (Step 58).

[0020] Next, the first photographing part 20 is displayed on the display 17 with the display designating operation machine 15 of drawing 1 (Step 59), and a desired part is chosen (Step (for example, the cranium a1) 60). The second photographing part b11-b15 of the selected part a1 concerned is displayed (Step 61). This chooses a desired part (for example, paranasal sinus b15) (Step 62), and the image data 22 of the positioning of b15-1 corresponding to the part b15 concerned and the condition data 23 corresponding to this are displayed (Step 63). In this case, it is good like drawing 3 to add and display the help 32 on the condition data 23 (editing table 31). Next, the clinical photograph data 40 (clinical photograph 50) and the alphabetic data 41 (help 51) of b15-2 corresponding to the part b15 concerned are displayed if needed (Step 64). The picture displayed at Steps 63 and 64 may be printed out with a printer (Step 65).

[0021] Next, an operating procedure is explained. The procedure in the case of displaying the picture 30 and the editing table 31 of the paranasal sinus (back to front) of drawing 3 on the display 17 of drawing 1 is explained. An operator displays the photographing part 20 of drawing 2 on the display 17 using the display designating operation machine 15 of the personal computer 10. Since a paranasal sinus (back to front) corresponds to one in the cranium a1, the cranium a1 is specified with the display designating operation machine 15. The photographing parts b11-b15 equivalent to the pointer a1 of photographing part file (II) of drawing 2 are displayed on the display 17. The paranasal sinus (back to front) b15 is chosen from this inside. Then, the picture 30 and the editing table 31 of the image data 22 specified by pointer b15-1 which is file (III), and the condition data 23, i.e., drawing 3, are displayed on the display 17. The help 32 may be displayed in accordance with this condition table 31. It is also good to display the clinical photograph 50 of drawing 5 specified by pointer b15-2, and its help 51 on a display. The hard copy of the picture and data which were displayed on the display can also be carried out with a printer if needed.

[0022] Form the personal computer 10 which gave the function which supports the operation of an operator in the jack key lamp panel 62, in the example of this invention described above, when that operating procedure also operated this personal computer, were made to carry out, but. In this invention, it is good to constitute so that the function which supports the operation of an operator further may be interlocked with the ANATOMI cull program included in the conventional device. In this case, an ANATOMI cull program as mentioned above by operation of the program page button 701 of the navigational panel 70 of the jack key lamp panel 62. If the 1st photographing part is displayed on the display panel 71 and touches a desired part from this 1st photographing part, the 2nd photographing part that shows those details will be displayed on the display panel 71.

[0023] Therefore, by adding the program function which displays the positioning of drawing 3 and the clinical photograph of drawing 5 which are the main parts of the example of this invention on the display panel 71 by a publicly known means to this ANATOMI cull program, By touching touch type push button 15' of the display panel 71, the operator can display a clinical photograph (drawing 5) on the display panel 71 desired positioning (drawing 3) and if needed. Although positioning and a clinical photograph were displayed on the display panel 71, this invention is not limited to this, provides display panel with the another display panel 71, for example, and it may be made to display it on this in the above-mentioned example. Since a photographing condition and positioning can always be displayed by constituting in this way, these, said posture, and the example of a clinical photograph can be consulted and photoed.

[0024]

[Effect of the Invention] According to this invention, the transmission direction and photographing condition of the operation body which should become a display panel of the jack key lamp panel of a console with a model, and the X-

rays to the posture are simultaneously displayed on a display panel, Since it enabled it to display the clinical photograph corresponding to positioning on a display panel if needed, operation of the roentgenography by an operator can be made easier than before.

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[Translation done.]

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1]It is a block diagram of hardware showing the example of this invention.

[Drawing 2]It is a block diagram of file organization showing the example of this invention.

[Drawing 3]It is a figure showing correspondence with the positioning and the condition table showing the example of this invention, and a help.

[Drawing 4]It is a block diagram of file organization showing other examples of this invention.

[Drawing 5]It is a figure showing correspondence with the clinical photograph and help which show the example of this invention.

[Drawing 6]It is a block diagram showing the process flow of the example of this invention.

[Drawing 7]It is a perspective view showing the console of the conventional X-rays equipment.

[Drawing 8]This invention is a top view expanding and showing a part of drawing 7 which added the example.

[Description of Notations]

10 Personal computer

11 Input unit

12 Printer

20 The first photographing part

21 The second photographing part

22 Image data

23 Condition data

30 Picture

31 Editing table

32 Help

50 Clinical photograph

51 Help

60 Buck

61 Support plate

62 Jack key lamp panel

70 Navigational panel

71 Display panel

701 Program page button

702 Touch button

703 Radiation button

710 Photographing condition

15'HELP button

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[Translation done.]

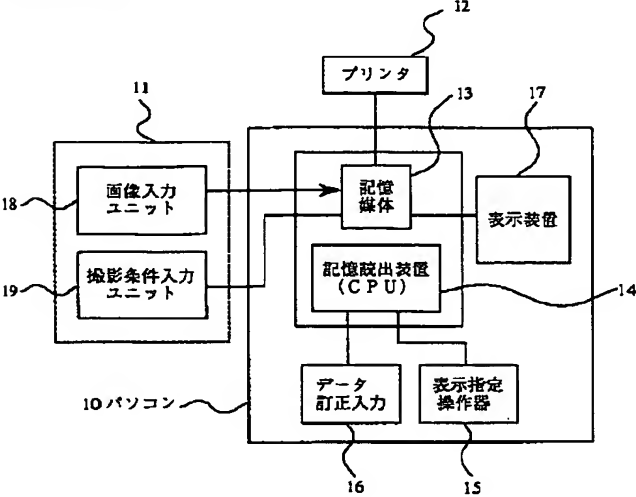
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DRAWINGS

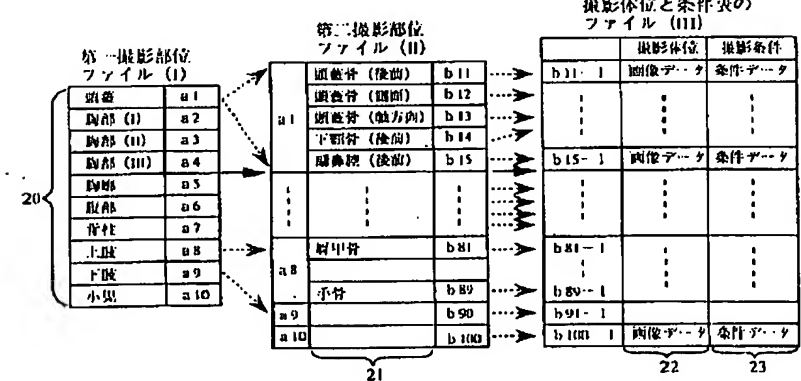
[Drawing 1]



[Drawing 4]

	臨床写真	ヘルプ
b 11-2	画像データ	文字データ
⋮	⋮	⋮
b 15-2	画像データ	文字データ
⋮	⋮	⋮
b 81-2	⋮	⋮
⋮	⋮	⋮
b 89-2	⋮	⋮
b 91-2	⋮	⋮
b 100-2	画像データ	文字データ
	40	41

[Drawing 2]



[Drawing 3]

30
撮影条件表 31

副鼻腔（前後）撮影手法

電流 mA	時間 sec	被写体厚 cm						距離 cm	リレー本 / cm
		電圧 kV							
100	0.32	14	16	18	20	22	100	34, 6:1	
		54	58	62	66	70			

増感紙: Konica KM-250  
フィルム: Konica SR-G

(ポジショニング) 32  
腹臥位。RBLがフィルムと80度になるように顎を引く。  
中心X線は鼻根部に向けて正中矢状面に垂直に入射する。

(撮影のポイント) 32  
前胸部の下にスポンジ枕を置き、両手をやや前方に置き  
頭部をささえるようにする。

Menu

- ヘルプ
- 撮影部位の選択へ戻る
- 終了

[Drawing 5]

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31

レントゲン写真

副鼻腔 (paranasal sinus)

(チェックポイント)

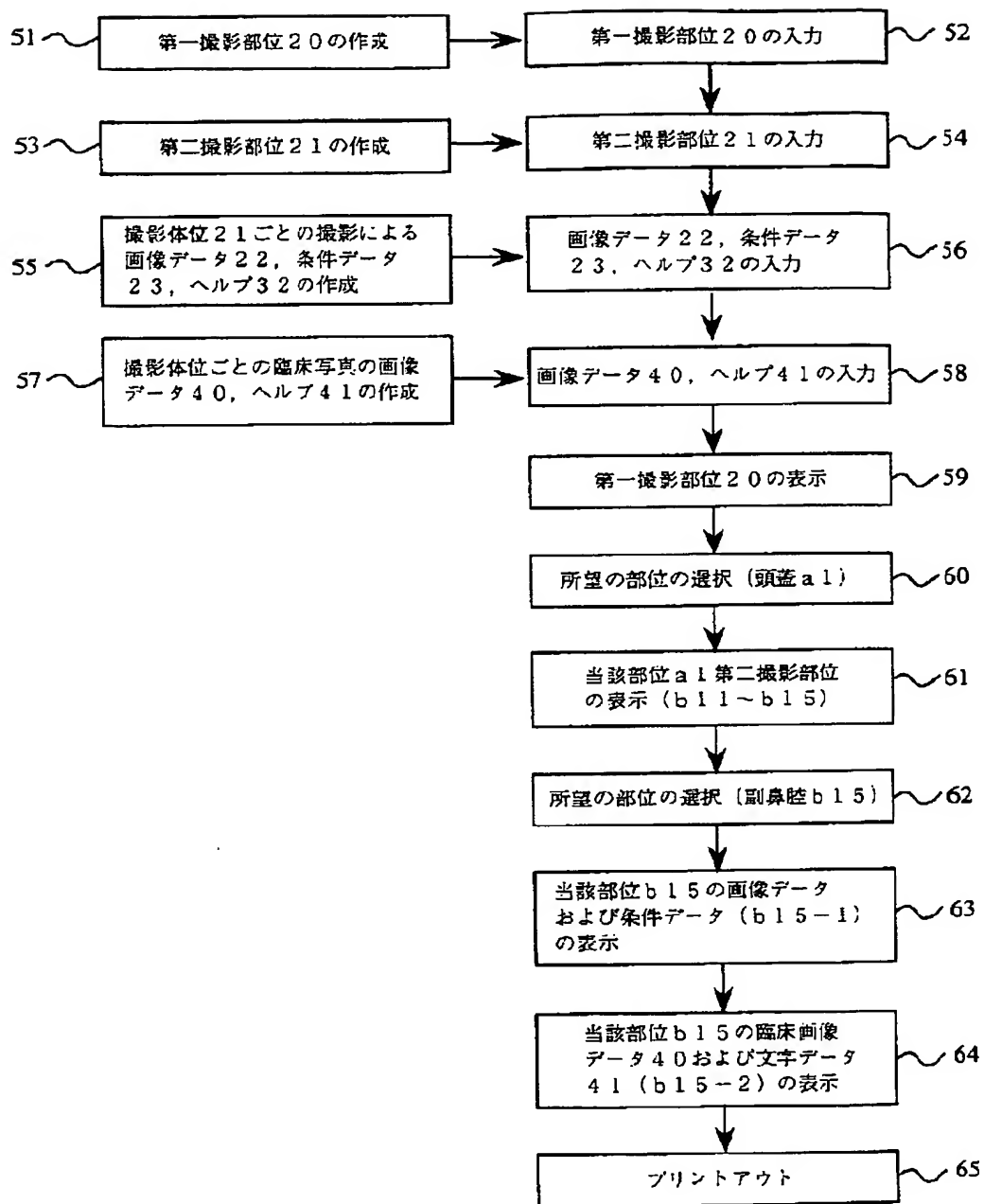
蝶体上縁臥眼中央よりやや下方に位置し、  
副鼻腔が左右対称に投影されている。

Menu

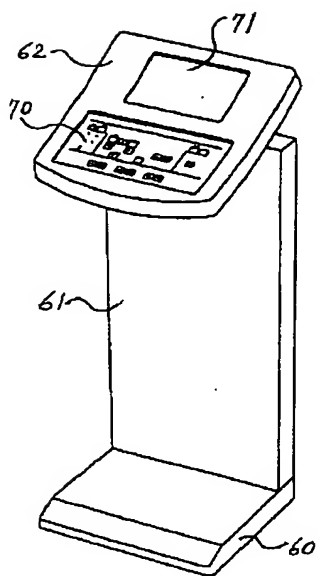
- 前面画の表示
- 撮影部位の選択へ戻る
- 終了

[Drawing 6]

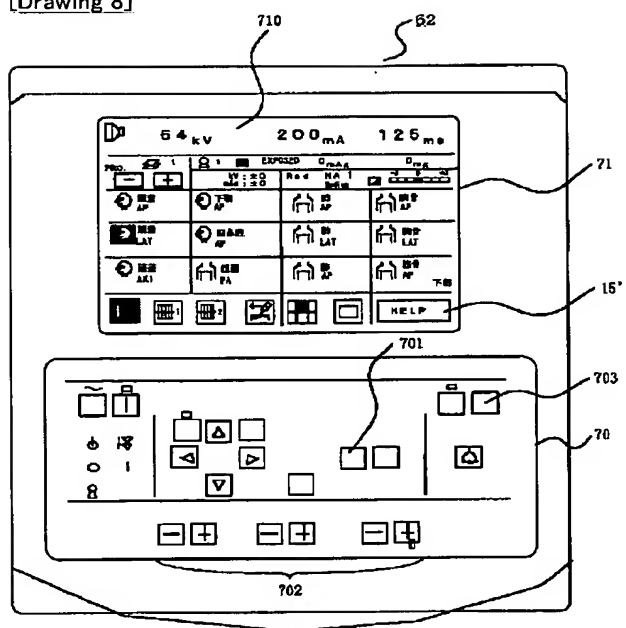




[Drawing 7]



[Drawing 8]



[Translation done.]